(defined by a score of 1 or higher on the Kellgren and Lawrence index determined from x-rays). The subjects were 22-79 years old and 59% were females. The subjects were submitted to MRI examination of both knees using an Esaote C-Span low-field 0.18 T scanner performing Turbo 3D T1 sequences with an average sagittal slice thickness of 0.81 mm. The medial cartilage compartments were manually delineated by a radiologist.
A software method for automatic cartilage segmentation from MR scans was designed. It was first trained on 25 scans not included in the evaluation data set to identify cartilage, thereafter automatically separated the voxels of the scans into three classes: tibial and femoral cartilage and background. Voxels were assigned to the most probable class based on prior knowledge of the cartilage structure. The segmentation method is automatic and thus has no intra-scan variability.
Results: The accuracy of the automatic method was evaluated by comparing with the manual delineations for the 114 scans. The segmentations had average sensitivity and specificity of 81.1% and 99.9% respectively. Furthermore, volume estimations correlated well with the manual ones (Fig. 1).
The reproducibility was estimated by the inter-scan variability. For this, 31 knees were scanned once more after approximately one week. The automatic method resulted in correlation coefficient 0.86 (p-value < 0.0001) between pairs of volumes estimated on the same knee.
The cartilage volumes obtained from the method were significantly lower in OA knees than the volumes of healthy knees (Fig. 2) when adjusted for difference in bone size ($p = 0.0063$).
Conclusion: The results show that the automatic cartilage segmentation method is robust, has high reproducibility, and is well-correlated with manual delineations. It may be used for quantification of cartilage volume and separation of healthy from OA populations. Prospective work involves longitudinal studies of cartilage volume in osteoarthritic knees.

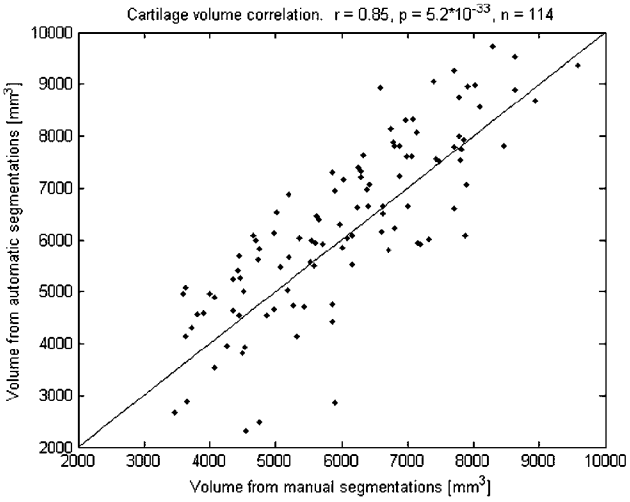

Fig. 1

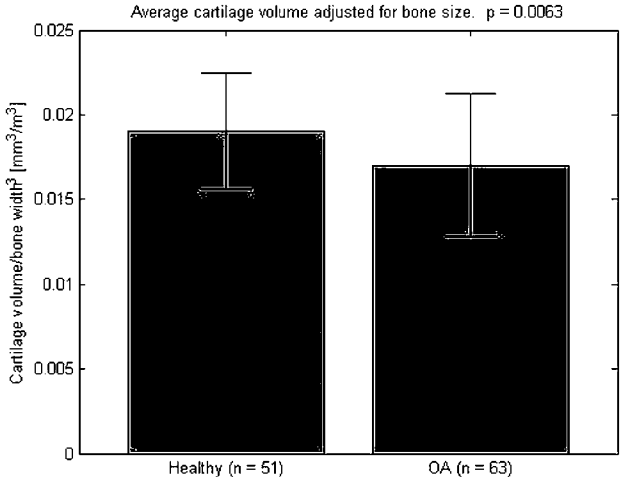

Fig. 2

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THE HIP JOINT SPACE WIDTH IS IN RELATION WITH THE ACETABULAR ROOF SHAPE: THE SHORTER THE ROOF, THE THICKER THE JOINT SPACE

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Aim: Does the pressure/cm^2 on cartilage during growth influence the joint space width (JSW)? If yes, a short acetabular roof (dysplasia) enhancing pressure/cm^2 should result in a thicker JSW, and, on the contrary, a large overcovering roof decreasing the pressure/cm^2 should lead to a thinner JSW. Hypothesis to be tested.
Methods: An anteroposterior pelvic x-ray was taken in 228 subjects without any history of hip pain. JSW was measured at its superolateral, apical and superomedial sites, using a millimetric ruler.The Wiberg VCE angle assessing the lateral coverage of the femoral head by the acetabular roof was measured with the help of an accurate arthrometer put on the x-ray. Likewise concerning the HTE angle, measuring the acetabular roof acclivity.The VCE angle was considered as insufficient (dysplasia) when $\geq 20°$ and as overcovering (coxa profunda) when $\geq 45°$. The HTE angle was considered as too much upward oblique (dysplasia) when above 12°. The best of the 2 trained readers tested (intraobserver reproducibility) measured all parameters. Wilcoxon rank test and Pearson correlation coefficient were used for non-parametric variables (SAS, version 6-12).
Results: 223 radiographs were assessable (5 painless OA were excluded), belonging to 127 women, 96 men, mean age 51.3 y (SD 16; range: 16-88 y). Mean JSW: 4.19mm (SD 0.92; range: 2-7). The JSW was inversely proportional to the VCE angle and proportional to the HTE angle with regard to the apical and superomedial sites, with a correlation statistically highly significant (see Table 1). Between the hips with VCE $\leq 20°$ and those with VCE $\geq 45°$, the difference of JSW was 0.97 mm ($p = 0.007$).

Table 1. Correlation of the JSW with the VCE and HTE angles: Pearson coefficient (p)

JSW site	VCE	HTE
superolateral	- 0.11 (0.02)	0.35 (< 0.009)
apical	- 0.27 (< 0.001)	0.35 (<0.001)
superomedial	- 0.35 (< 0. 001)	0.37 (< 0.001)

Conclusion: The JSW is thicker in acetabular dysplasia and thinner in coxa profunda, data to be considered when a possible JS narrowing (OA) is in question.

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SPATIAL HETEROGENEITY OF CARTILAGE T2 IN OSTEOARTHRITIC PATIENTS

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Purpose: The purpose of this study is to examine the spatial